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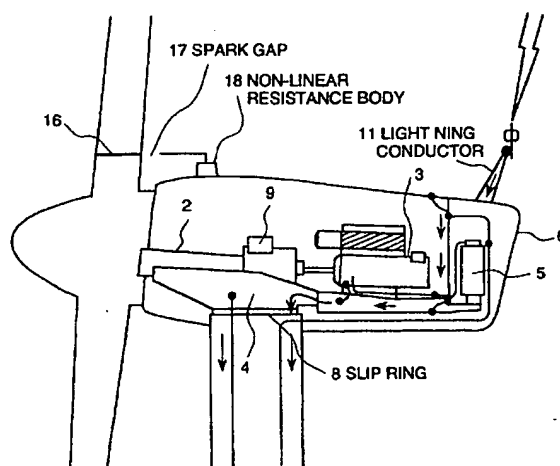
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(54) Lightning protection system for wind power generation installation

(57) In a lightning protection system for a wind power generation installation, a conductor ring 16 is provided on a wind mill vane 1 and at a rotor casing 6 incorporating a wind power generator 3 a zinc oxide element

18 is provided so as to face the conductor ring 16 with a spark gap 17, thereby, if a lightning in winter season which causes to flow a large current for a long duration time hits the wind mill vane 1, the wind power generation installation is effectively protected.

FIG. 2



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# EUROPEAN SEARCH REPORT

Application Number  
EP 00 10 5759

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 587 592 A (NAKANO KOUICHI ET AL) 6 May 1986 (1986-05-06) * abstract *	1	F03D11/00 F03D1/06 H02G13/00 H01C7/12
X	DE 44 45 899 A (AUTOFLUG ENERGIETECH GMBH) 27 June 1996 (1996-06-27) * column 4, line 9 - line 12 *	1-3	
A	US 5 547 907 A (KATSUMATA MASAOKI ET AL) 20 August 1996 (1996-08-20) * abstract *	3	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F03D H02G H01C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 October 2001	Examiner Raspo, F
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (03.02.1994) (P4/C01)



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#### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

#### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet 8

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-3



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**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number  
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**1. Claims: 1-3**

Lightning protection for a wind power generator including a rotating ring, a spark gap and a zinc oxide lightning arrestor

**2. Claim : 4**

A common aerial lightning protection system located above an array of wind power generators

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 10 5759

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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04-10-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4587592 A	06-05-1986	JP 1720545 C	14-12-1992
		JP 4003649 B	23-01-1992
		JP 60070702 A	22-04-1985
		CA 1242759 A1	04-10-1988
		DE 3476717 D1	16-03-1989
		EP 0141239 A1	15-05-1985
DE 4445899 A	27-06-1996	DE 4445899 A1	27-06-1996
		DE 19501267 A1	29-08-1996
		EP 0718495 A1	26-06-1996
US 5547907 A	20-08-1996	JP 2819691 B2	30-10-1998
		JP 3150802 A	27-06-1991
		JP 2727699 B2	11-03-1998
		JP 3150803 A	27-06-1991
		JP 2830264 B2	02-12-1998
		JP 3208303 A	11-09-1991
		JP 2819714 B2	05-11-1998
		JP 3208304 A	11-09-1991
		JP 2819731 B2	05-11-1998
		JP 3238801 A	24-10-1991
		US 5447892 A	05-09-1995
		AU 641249 B2	16-09-1993
		AU 7787991 A	13-06-1991
		DE 69021552 D1	14-09-1995
		DE 69021552 T2	18-01-1996
		DE 69027866 D1	22-08-1996
		DE 69027866 T2	09-01-1997
		DE 69027867 D1	22-08-1996
		DE 69027867 T2	12-12-1996
		EP 0452511 A1	23-10-1991
		EP 0620566 A1	19-10-1994
		EP 0620567 A1	19-10-1994
		WO 9107763 A1	30-05-1991
		KR 9611155 B1	21-08-1996
		US 5294908 A	15-03-1994

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82